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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to a high sensitivity electro photography photo conductor and the electrophotography device using it with high resolution.

[0002]

[Description of the Prior Art]C.F. Since a sex, high quality, and a highly preservable picture are acquired instancy, by recent years, the electrophotographic technology by the invention of Carlson does not remain in the field of a copying machine, but also in the field of various printers or a facsimile, is used widely and shows big breadth. Fundamentally this electrophotography process "Uniform electrification of ** photo conductor", "formation of the electrostatic latent image by ** image exposure", It comprises five processes of "the development by the toner of ** this latent image", and "the image formation by the transfer (it may go via a transferred body in the middle) and *** fixing to the paper of ** this toner image." About the photo conductor used as the core of electrophotographic technology. As the photoconducting material, it is pollution-free these days [the photoconducting material of Se from the former, an As-Se alloy, and an inorganic system called CdSZnO to], and the photo conductor which uses the photoconducting material of the organic system which has an advantage which is not seen by an inorganic system, like ease [membrane formation] and manufacture are easy and there are is developed. What is called a lamination type photo conductor that laminated the charge generating layer especially constituted by a substance with a high charge generating function, and the charge transport layer which comprised a substance with a high charge transport function, Since the function is limited in each layer, that a photo conductor with high safety with a wide selection range of material is obtained, a high sensitivity photo conductor's being obtained, and manufacture by spreading are possible, and productivity is high, and also by the cost aspect, since it is advantageous, it has become in use

[a photo conductor] now, and is produced in large quantities.

[0003]Replacing the conventional white light, exposing a photosensitive layer by semiconductor laser light or LED array light with digitization of picture information, etc., by using a semiconductor laser or an LED array as a record light source, and recording picture information in recent years is performed. Now, a 780 nm near infrared and the 650-nm source of red light are most often used as an exposure light source of a photosensitive layer. When using information, including a character etc., directly as a computer output, picture information is recorded by the print-out of the computer changed into the lightwave signal on a photo conductor, but the digitized picture information. When the picture information of a manuscript is inputted, after the picture information of a manuscript is read as light information and changed into digital electric signals, again, it is changed into a lightwave signal and picture information is recorded on a photo conductor by the lightwave signal.

[0004]The portion with which in any case picture information was recorded on the photosensitive layer by the minute light spot irradiated by the photosensitive layer from an optical recording head, a record optical system, etc., and light spot was irradiated is developed by a toner. A picture is expressed by the set and arrangement of a minute dot which are called the pixel developed by the toner. For this reason, in the optical recording head and the record optical system, it is high-density, and high-resolution-ization is advanced so that a minute spot can be formed, as picture information can be recorded. About the optical system which records picture information on a photosensitive layer, the variable spot laser recording method (O plus E May, 1996), the multi-laser-beam recording method, ultraprecise, an ultra high-speed polygon mirror (Japan Hardcopy'96 collected papers), etc. are developed. As a result, the optical system for recording picture information on a photosensitive layer is developed by the optical system now with the storage density more than 1200dpi (dot/inch: dot number per inch).

[0005]Even if the optical system which records picture information on a photosensitive layer with high density as mentioned above is developed, it is not necessarily easy to record with sufficient reproducibility on a photosensitive layer by making picture information into an electrostatic latent image. In recent years, the high sensitivity charge generating material has been developed with improvement in the speed of a printer and a copying machine. Especially titanylphthalocyanine has high electric charge developmental potency power, and the high value [quantum efficiency] 0.82 is also reported depending on the crystal form. With the (Japan Hardcopy'89 collected papers 103 (1989)), however a lamination photo conductor, when such a high sensitivity charge generating material is used, there is a fault that desired high resolution is not obtained. Although the details of this phenomenon are not clear, a lot of electric charges are accumulated in a charge transport layer interface at once, space charge is formed, in order for the electric field of the direction of the surface to fall temporarily, the

diffusion to the transverse direction of an electric charge becomes remarkable, and it is thought that resolution lowering will be carried out. Also in the photo conductor of the monolayer type which distributed the high sensitivity charge generating material in the charge transporting material, there is a problem that desired high-sensitivity-izing is difficult. If this has the low injection efficiency to a charge transporting material, before the career by which it was generated in the charge generating material is accumulated and is poured in in a charge generating material as it is, it will be recombined and will be considered that it cannot carry out [high sensitivity]-izing. Although the trial arranged according to the ionization potential of a charge generating material and a charge transporting material is performed about the injection efficiency from this charge generating material to a charge transporting material, the actual condition is there being an element resulting from both structure and generally being unable to arrange.

[0006]On the other hand, enamine compounds attract attention as a high mobility charge transporting material in recent years, and as a thing using phthalocyanines and enamine compounds, JP,2812618,B, the patent No. 2816059 gazette, JP,10-69107,A, Although indicated by JP,10-133401,A, JP,10-148953,A, JP,11-305459,A, JP,2000-112157,A, or JP,2000-242007,A, it is insufficient for high-resolution-izing. Although using specific oxo titanylphthalocyanine and enamine compounds by JP,2000-206710,A about high-resolution-izing is shown, it is necessary to make thickness thin, and there is a fault to which the life at the time of a repetition falls.

[0007]

[Problem(s) to be Solved by the Invention]In order to realize a high resolution photo conductor by high sensitivity, the injection efficiency from the mobility of that the quantum efficiency of a charge generating material is only high and a charge transporting material being not only high but a charge generating material to a charge transporting material needs to be high. The purpose of this invention finds out material with such high injection efficiency, and there is in realizing the electro photography photo conductor of high resolution and high sensitivity. It is in furthermore raising the endurance at the time of repetition use of this electro photography photo conductor. It is in realizing the copying machine and printer which output the high brilliance picture of 1200 or more dpi, and FAX by furthermore carrying this electro photography photo conductor.

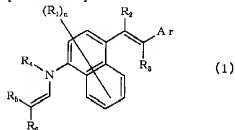
[0008]

[Means for Solving the Problem]That this invention persons should develop a photo conductor of high sensitivity and high resolution A charge generating material, As a result of repeating examination wholeheartedly about a charge transporting material, it succeeded in realizing a photo conductor of high resolution by high sensitivity by using oxy titanylphthalocyanine for a charge generating material, and using specific enamine compounds as a charge transporting

material. It succeeded in realizing an electro photography photo conductor which also has endurance by using a specific additive agent.

[0009] That is, an electro photography photo conductor, wherein this invention contains N**NAFU chll enamine compounds expressed with oxo titanylphthalocyanine and a following general formula (1) to a photosensitive layer in an electro photography photo conductor which has a photosensitive layer on a conductive substrate is provided.

[Formula 5]



The aryl group in which Ar may have a substituent among [type, an aralkyl group, a heterocycle group or the alkyl group of the carbon numbers 1-5, and R_1 , The alkyl group of the carbon numbers 1-5 which may have a substituent, the alkoxy group of the carbon numbers 1-5, The thioalkoxy group of the carbon numbers 1-5, the dialkylamino group of the carbon numbers 1-5 or a hydrogen atom, and R_2 , The aralkyl group which may have a substituent, the alkyl group of the carbon numbers 1-5, or a hydrogen atom, The aryl group, aralkyl group and heterocycle group which may have a substituent or the alkyl group of the carbon numbers 1-5, and R_4 , R_3 , The aryl group, R_5 , and R_6 which may have a substituent are the same or different, and the aryl group, aralkyl group and heterocycle group which may have a substituent, the alkyl group of the carbon numbers 1-5 or a hydrogen atom, and n express the integer of 0 to 6. However, when both Ar and R_3 are hydrogen, the case where both R_5 and R_6 are hydrogen is excluded.]

This invention provides an electrophotography device using the above-mentioned electro photography photo conductor for a process of 1200 or more dpi of resolution.

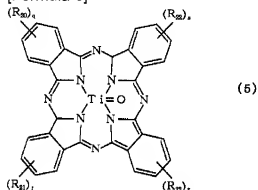
[0010]

[A mode of implementation of an invention] Hereafter, this invention is explained in detail. A lamination type electro photography photo conductor in which a photosensitive layer comprises two-layer [of a charge generating layer and a charge transport layer] like drawing 1 as composition of an electro photography photo conductor of this invention, A monolayer type ***** photo conductor which contains charge transport material and charge generating material in a photosensitive layer like drawing 2, Any composition of a conductive substrate and a monolayer type electro photography photo conductor which provided an under-coating layer as an interlayer and provided an under-coating layer as an interlayer between a

conductive substrate and a photosensitive layer like a lamination type electro photography photo conductor or drawing 4 between photosensitive layers can be taken like drawing 3. As a conductive substrate, for example Aluminum, an aluminum alloy, stainless steel, Metallic materials and aluminum, such as iron, gold, silver, copper, zinc, nickel, and titanium, A plastic containing a plastic, paper, or a conductive polymer containing a plastic base, polyester film, paper, or a conductive particle which vapor-deposited gold, silver, copper, nickel, indium oxide, tin oxide, etc., etc. can be used. As those shape, things, such as the shape of a drum, a sheet shaped, and the shape of a seamless belt, can be used.

[0011]As charge generating material of this invention, an oxo titanylphthalocyanine compound expressed with a following general formula (5) is used.

[Formula 6]



R_{20} , R_{21} , R_{22} , and R_{23} express a hydrogen atom, a halogen atom, an alkyl group, or an alkoxy group among [type, and q, r, s, and t express the integer of 0 to 4.]

A method by which this oxo titanylphthalocyanine is indicated to the "phthalocyanine compound" (Moser and Thomas. "Phthalocyanine Compounds") of Moser and Thomas, Or it is compoundable by the other various publicly known methods.

[0012]Among the compounds expressed with the above-mentioned general formula (5), a desirable compound, In the X diffraction spectrum over Cu-K alpha rays (wavelength: 1.5418A), it is crystal form oxo titanylphthalocyanine in which it has the overlapping maximum peak bunch of 9.4 degrees and 9.6 degrees by a bragg angle ($2\theta \approx 0.2$ degree), and a 27.2-degree peak has the 2nd maximum peak. This oxo titanylphthalocyanine can be obtained with the synthetic method indicated to JP,10-237347,A, for example.

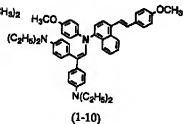
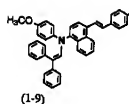
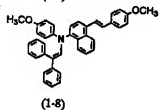
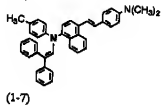
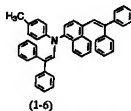
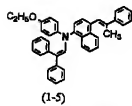
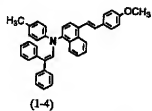
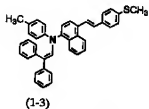
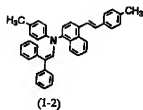
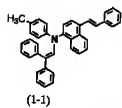
[0013]In the case of a lamination type electro photography photo conductor, as a manufacturing method of a charge generating layer, Add an organic solvent to particles of the above-mentioned phthalocyanine compound, and A ball mill, In the case of a sheet, using coating liquid produced by grinding and distributing by Sand grinder, paint shaker, an ultrasonic dispersion machine, etc. with a baker applicator, a bar coating machine, casting, a spin coat, etc. In the case of a drum, it is produced by spray method, vertical Ling's method, a

dip coating method, etc. Since a binding property is increased, as binder resin, for example Under the present circumstances, polyester resin, Polyvinyl acetate, polyacrylic ester, polycarbonate, Polyarylate, a polyvinyl aceto acetal, polyvinyl propional, Various binder resin, such as a polyvinyl butyral, phenoxy resin, an epoxy resin, urethane resin, melamine resin, silicone resin, an acrylic resin, cellulose ester, cellulose ether, and polyvinyl chloride acetate copolymer resin, may be added. As for the thickness, 0.05 micrometer - 5 micrometers are usually preferred, and 0.1-1 micrometer is especially preferred for it. Various additive agents, such as a leveling agent for improving spreading nature, an antioxidant, a sensitizer, may be added to a charge generating layer if needed.

[0014]A charge transport layer mainly comprises charge transport material and binder resin, and N-naphthyl enamine compounds expressed with said general formula (1) are used as charge transport material. As a desirable concrete example, the following compounds are mentioned among N-naphthyl enamine compounds expressed with this general formula (1).

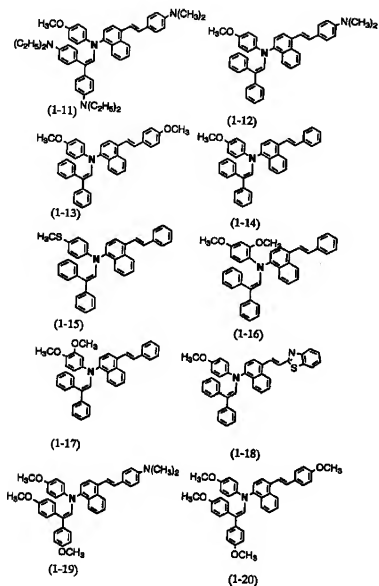
[0015]

[Formula 7]



[0016]

[Formula 8]



[0017] These N-naphthyl enamine compounds can be obtained with the synthetic method indicated, for example in the 2816059th gazette of a patent. Such charge transport material may be independent, or two or more compounds may be mixed and it may be used. enamine compounds similar when mixing and using two or more compounds -- or, Carbazole, Indore, imidazole, oxazol, a pyrazole, Electron-donative substances, such as a polymer which has a basis which consists of heterocyclic compounds, such as oxadiazole, pyrazoline, and thiadiazole, aniline compounds, a hydrazone compound, an aromatic amine compound, a styryl compound, enamine compounds, or these compounds in a main chain or a side chain, are mentioned. Preferably, the presentation which uses N-naphthyl enamine compounds as the main ingredients is preferred.

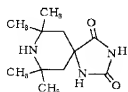
[0018] A charge transport layer is formed in a form which such charge transport material bound to binder resin. As binder resin used for a charge transport layer, For example, vinyl

polymerization objects, such as polycarbonate, polymethylmethacrylate, polystyrene, and polyvinyl chloride, and a copolymer of those, polyester, polyester carbonate, polyarylate, polysulfone, polyimide, phenoxy, epoxy, silicone resin, etc. are mentioned. A partial bridge construction hardened material of these resin can also be used. A rate of binder resin and charge transport material is usually preferably used in the range of 40 to 150 weight section 30 to 200 weight section to binder resin 100 weight section. Generally 10-45 micrometers of thickness 5-50-micrometer are preferably good. These charge transport layers are applied with the same device as a charge generating layer.

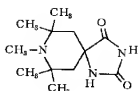
[0019]A well-known plasticizer in order to raise membrane formation nature, flexibility, spreading nature, etc. in a charge transport layer, Although additive agents, such as an antioxidant, an ultraviolet ray absorbent, and a leveling agent, may be made to contain, It is preferred to make a hindered amine compound or a hindered phenolic compound preferably expressed with said general formula (3) as an antioxidant and a method of raising endurance, without spoiling the characteristic of N-naphthyl enamine compounds still more preferably contain.

[0020]The following compound is mentioned as a concrete compound with a preferred hindered amine compound expressed with said general formula (3).

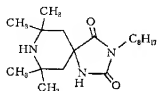
[Formula 9]



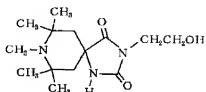
(3-1)



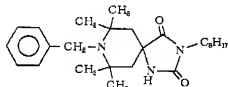
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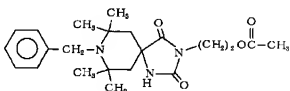
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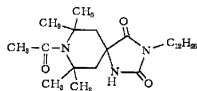
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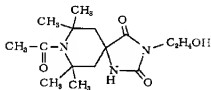
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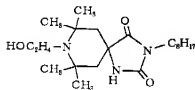
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(3-7)



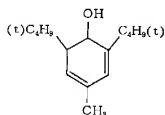
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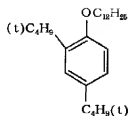
(3-9)

[0021]The compound expressed with said general formula (4) as a hindered phenolic compound is preferred. The following compound is mentioned as an example of a hindered phenolic compound expressed with this general formula (4).

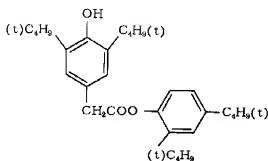
[Formula 10]



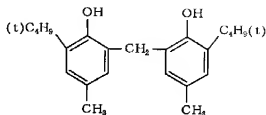
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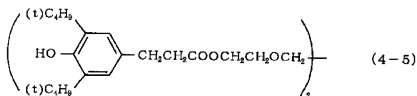
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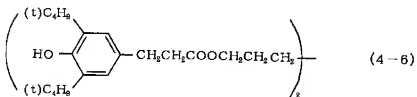
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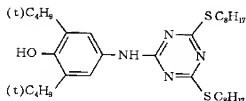
(4-4)



(4-5)



(4-6)



(4-7)

[0022] On the other hand, oxo titanylphthalocyanine is distributed as charge generating material in the charge transport layer which consists of the above compounding ratios as a photosensitive layer in the case of a monolayer type electro photography photo conductor. The particle diameter in that case needs a small enough thing, and is preferably used at 1

micrometer or less. If too little [the quantity of the charge generating material distributed in a photosensitive layer], it has the evil of the shortage of sensitivity, inducing an electrostatic property fall and sensitivity lowering, if excessive, and it is preferably used at 1 to 20 % of the weight 0.5 to 50% of the weight. 5-40 micrometers of thickness of a photosensitive layer are preferably used at 15-30 micrometers.

[0023]It is good to make an antioxidant of this invention contain preferably also in this case. A publicly known plasticizer for improving membrane formation nature, flexibility, a mechanical strength, etc., An additive agent of a leveling agent for improving a distributed adjuvant for an additive agent for controlling rest potential and improvement in dispersion stability and spreading nature, a surface-active agent, for example, silicone oil, fluorine system oil, and others may be added. Furthermore between a conductive substrate and a photosensitive layer, an interlayer may be provided. As an interlayer, for example An aluminum anode oxide layer, an aluminum oxide, Organic layers, such as inorganic layers, such as aluminium hydroxide, polyvinyl alcohol, casein, a polyvinyl pyrrolidone, polyacrylic acid, cellulose, gelatin, starch, polyurethane, polyimide, and polyamide, are used. Although conductivity or semi-conductive particles of metal, such as aluminum, copper, tin, zinc, and titanium, or a metallic oxide may be included in these interlayers, especially titanium oxide is preferred. 0.1-50 micrometers of an interlayer's thickness are preferably used at 0.5-20 micrometers. A protective layer may be provided, in order to protect a photosensitive layer surface if required. Thermoplastics, and light or thermosetting resin can be used for a surface protection layer.

[0024]Although an example is given and [Example], next this invention are explained concretely, this invention is not limited to the following examples, unless the meaning is exceeded.

[0025](Example 1 of manufacture) Carry out heating stirring for 3 hours, and 40 g of o-phthalodinitrile, the titanium tetrachloride 18g, and 500 ml of alpha-chloronaphthalenes are made to react at 200-250 °C under a nitrogen atmosphere, It filtered after radiational cooling to 100-130 °C at the time of heat, it washed by 200 ml of alpha-chloronaphthalenes heated at 100 °C, and the dichloro titanium phthalocyanine rough product was obtained. In 200 ml of alpha-chloronaphthalenes, subsequently, 200 ml of methanol performs ***** for this rough product in 500 ml of methanol further after washing at a room temperature for 1 hour. ***** was repeated until pH was set to 6-7 in 500 ml of water in the obtained rough product after filtration. Then, it dried and the oxo titanylphthalocyanine middle crystal was obtained. The X diffraction spectrum of the obtained crystal is shown in drawing 6. It turns out that it is crystal form oxo titanylphthalocyanine called Y type of a statement to JP,2-8256,A and JP,7-271073,A which show the maximum diffraction peak to 27.3 degrees of bragg angles (2θ 0.2 degree), and have a diffraction peak at 7.4 degrees, 9.7 degrees, and 27.3 degrees.

[0026](Example 2 of manufacture) After mixing to cyclohexanone, carrying out milling

processing with a glass bead 2 mm in diameter by paint conditioner wearing (made by a red level company) and methanol's washing this crystal, it dried and a crystal of this invention was obtained. An X diffraction spectrum of an obtained crystal is shown in drawing 7. It turns out that it is oxo titanylphthalocyanine of a crystal form which indicates the maximum diffraction peaks to be 9.4 degrees of bragg angles ($2\theta \approx 0.2$ degree) to an overlapping peak bunch of 9.7 degrees, and shows the 2nd maximum peak to 27.2 degrees.

[0027] Measurement of an X diffraction was performed on the following conditions.

X line source $\alpha = 1.5418 \text{ \AA}$ of CuK(s) voltage 40-kV current 50-mA start angle 5.0deg.

Stop angle 30.0deg.

Travel 0.02deg.

Measuring time 0.5deg./sec measuring method $\theta/2\theta$ Scanning procedure [0028]

[Example 1] Titanium oxide (Ishihara Sangyo [Kaisha, Ltd.] make: TT055A) 7 weight section and copolyamide (Toray Industries [, Inc.] make: CM8000) 13 weight section are added to a partially aromatic solvent of methyl alcohol 159 weight section and 1,3-dioxolane 106 weight section, Distributed processing was carried out with a paint shaker for 8 hours, and coating liquid for interlayers was prepared. This coating liquid was filled to a spreading tub, a drum-like base material made from aluminum (30 mm in diameter and 326.3 mm in overall length) was immersed, pulled up and air-dried as a conductive substrate, and an interlayer of 1 micrometer of thickness was formed. And oxo titanylphthalocyanine 3 weight section which has an X diffraction spectrum of drawing 7 compounded in the example 2 of manufacture as a charge generating material, The amount part of butyral resin (Sekisui Chemical [Co., Ltd.] make: BL-1) duplex was mixed to methyl-ethyl-ketone 245 weight section, and coating liquid for charge generating layers produced by a paint shaker distributing was applied on the above-mentioned interlayer, it air-dried, and a charge generating layer of 0.4 micrometer of thickness was formed. Then, enamine-compounds 5 weight section shown with a structural formula of illustration compound No.1-8 as a charge transporting material, Polycarbonate resin (Mitsubishi Gas Chemical Co., Inc. make-CZ400) 8 weight section is mixed, Coating liquid for charge transport layers was made by using tetrahydrofuran 49 weight section as a solvent, on the above-mentioned charge generating layer, it dried at spreading and 110°C for 1 hour, a charge transport layer of 21 micrometers of thickness was formed, and an electro photography photo conductor of composition of being shown in drawing 4 was produced.

[0029][Example 2] Enamine compounds shown with a structural formula of illustration compound No.1-10 in a charge transporting material in Example 1 were used, and also an electro photography photo conductor was produced like Example 1.

[0030][Example 3] Enamine compounds shown with a structural formula of illustration compound No.1-12 in a charge transporting material in Example 1 were used, and also an electro photography photo conductor was produced like Example 1.

[0031][Example 4] Titanium oxide (Ishihara Sangyo [Kaisha, Ltd.] make: TTO55A) 7 weight section and copolyamide (Toray Industries [, Inc.] make: CM8000) 13 weight section are added to a partially aromatic solvent of methyl alcohol 159 weight section and 1,3-dioxolane 106 weight section, Distributed processing was carried out with a paint shaker for 8 hours, and coating liquid for interlayers was adjusted. This coating liquid was filled to a spreading tub, a drum-like base material made from aluminum (30 mm in diameter and 326.3 mm in overall length) was immersed, pulled up and air-dried as a conductive substrate, and an interlayer of 1 micrometer of thickness was formed. And after mixing oxo titanylphthalocyanine 8 weight section which has an X diffraction spectrum of drawing 7 compounded in the example 2 of manufacture as a charge generating material to tetrahydrofuran 100 weight section and carrying out distributed processing with a paint shaker, Enamine-compounds 100 weight section shown with a structural formula of the illustration compound 1-8 as a charge transporting material, polycarbonate resin (Mitsubishi Gas Chemical Co., Inc. make-CZ400) 100 weight section, and tetrahydrofuran 680 weight section were mixed and stirred, and coating liquid for photosensitive layers was produced. This coating liquid was filled to a spreading tub, a drum-like base material made from aluminum (30 mm in diameter and 326.3 mm in overall length) was immersed and pulled up as a conductive substrate, and a monolayer type photo conductor of composition of drying at 110 °C for 1 hour, and being shown in drawing 5 of 20 micrometers of thickness was formed.

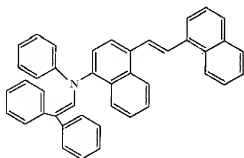
[0032][Example 5] Oxo titanylphthalocyanine which has an X diffraction spectrum of drawing 6 compounded in the example 1 of manufacture as a charge generating material in Example 1 was used, and also an electro photography photo conductor was produced like Example 1.

[0033][Example 6] Hindered amine compound (SANORULS440 by Sankyo Co., Ltd.) 0.1 weight section further shown in charge transport layer coating liquid by illustration compound No.3-7 in Example 1 was added, and also an electro photography photo conductor was produced like Example 1.

[0034][Example 7] Hindered phenolic compound (Sumi Reiser BHT by Sumitomo Chemical Co., Ltd.) 0.5 weight section further shown in charge transport layer coating liquid by illustration compound No.7-1 in Example 1 was added, and also an electro photography photo conductor was produced like Example 1.

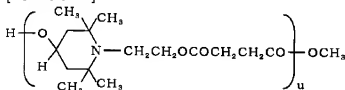
[0035][Example 8] Enamine compounds shown with the following structural formula in a charge transporting material in Example 1 were used, and also an electro photography photo conductor was produced like Example 1.

[Formula 11]



[0036][Example 9] Added hindered amine compound (molecular weights 3100 [-] 4000: Ciba Specialty Chemicals tinuvin 622LD) 0.1 weight section further shown in charge transport layer coating liquid with the following structural formula in Example 1, and also. An electro photography photo conductor was produced like Example 1.

[Formula 12]



[0037](Comparative example 1) In Example 1, X type non-metal phthalocyanines (Dainippon Ink & Chemicals, Inc. make fast gene blue 8120BS) were used as a charge generating material, and also the electro photography photo conductor was produced like Example 1.

[0038](Comparative example 2) In Example 1, the 4-dibenzylamino 2-methyl benzoic aldehyde 1 and 1-diphenylhydrazone (Annan CTC-191) were used as a charge transporting material, and also the electro photography photo conductor was produced like Example 1.

[0039](Comparative example 3) In Example 4, 4-dibenzylamino 2-methyl benzoic aldehyde 1,1-diphenylhydrazone (Annan CTC-191) was used as a charge transporting material, and also the monolayer electro photography photo conductor was produced like Example 4.

[0040][Evaluation]

1. Sensitivity was evaluated for an electro photography photo conductor in which sensitivity carried out evaluation production using a drum sensitivity test machine (made by GENTEC). Electrify the photo conductor surface in -600V with a scorotron charger, and it ranks second, Monochromatic light with a wavelength of 780 nm taken out from white light of a halogen lamp which is an exposure light source using a band pass filter was exposed on the photo conductor surface, and energy taken to set the above-mentioned surface potential to one half was set to reduction-by-half light exposure $E1/2$ ($\mu\text{J}/\text{cm}^2$). Surface potential at the time of 5 second passage was measured as rest potential $V_r(V)$ from an exposure start. About Example 4 and the comparative example 3, electrified polarity was made reverse, and it measured as right electrification. A result is shown in Table 1. This result shows that an electro photography

photo conductor of this invention is high sensitivity. It turns out that especially N-naphthyl enamine compounds of specific structure of Examples 1-3 are high sensitivity more nearly further than N-naphthyl enamine compounds of Example 8.

[0041]

[Table 1]

例	V0 (V)	E1/2 (μ J/cm ²)	Vr (V)
実施例 1	-600	0.11	-5
実施例 2	-600	0.13	-9
実施例 3	-600	0.12	-8
実施例 4	600	0.17	25
実施例 5	-600	0.14	-13
実施例 6	-600	0.12	-10
実施例 7	-600	0.14	-13
実施例 8	-600	0.15	-15
実施例 9	-600	0.14	-14
比較例 1	-600	0.35	-70
比較例 2	-600	0.25	-45
比較例 3	600	0.47	90

[0042]2. It carries in an experimental aircraft converted so that a dot of 1200dpi could output a copying machine (AR-N200 by a sharp company) of marketing of an electro photography photo conductor in which resolution carried out evaluation production, Data (data made carry out the front scan of the laser and off 1 dot) which makes white 1 dot write to black solid with a personal computer was created, this data was transmitted via a printer interface and a printed-out outputted image was observed. However, about Example 4 and the comparative example 3, an electro photography photo conductor which produced it further after converting a converted experimental aircraft into a right electrification process was carried, and same image evaluation was performed. An evaluation result is shown in Table 2. This result showed that the photo conductor of this invention could output sufficient high resolution images.

[0043]

[Table 2]

例	評価結果
実施例 1	黒ベタ上の1ドットの白点が確認可能
実施例 2	同上。
実施例 3	同上。
実施例 4	同上。
実施例 5	同上。
実施例 6	同上。
実施例 7	同上。
実施例 8	同上。
実施例 9	同上。
比較例 1	画像濃度低い。解像度評価に差らず。
比較例 2	全面黒ベタ。1ドットの白点確認できず。
比較例 3	画像濃度低い。解像度評価に差らず。

[0044]3. The electro photography photo conductor produced by the durable evaluation example 6, Example 7, Example 9, and the comparative example 2 is carried in said copying

machine for evaluation, After the check of the picture in a half-tone chart, a surface potential meter (Model344 by TREK) is installed so that the surface potential in a developer-tank position can be measured, Surface potential (VH) when early electrification potential (VO) and a half-tone chart are copied, and surface potential (VL) when the black solid chart was copied were measured. next, A -- after performing 410,000 copies, same measurement was performed and the change at the time of repetition use was evaluated. A result is shown in Table 3. It turns out that the electro photography photo conductor of Example 6, Example 7, and Example 9 which made the antioxidant contain is repeatedly excellent in the endurance at the time of use compared with the comparative example 2. By making the antioxidant of specific structure contain like Example 6 and Example 7 shows that the electro photography photo conductor excellent in the endurance which has the more stable potential characteristic is made.

[0045]

[Table 3]

例	初期			1万枚使用後			ハーフトーン画像
	VO	VH	VL	VO	VH	VL	
実施例 6	590	355	85	585	360	85	初期、繰返し使用後も極めて良好。
実施例 7	590	360	85	580	360	95	初期、繰返し使用後も極めて良好。
実施例 9	590	355	85	590	370	106	初期、繰返し使用後も問題なし。
比較例 2	590	400	110	600	450	200	初期は良好だが、繰返し使用後に画像濃度低下と周期的な帯状の濃度ムラが発生。

(単位 -V)

[0046]

[Effect of the Invention]As explained to details above, the photo conductor containing N-naphthyl enamine compounds expressed with oxo titanylphthalocyanine and a specific general formula (1) to the photosensitive layer of this invention, It provides the basic properties of the electro photography photo conductor of having high sensitivity, and it not only excels in resolution, but excels in endurance further, therefore this invention realized the picture of high resolution, and the electrophotography device which was moreover excellent in endurance and which should be referred to as epoch-making was developed.

[Translation done.]